

WHAT IS CLAIMED IS:

1 1. A surgical instrument positioning system, comprising:
2 a pair of supports;
3 a cross member extending between the supports; and
4 at least one surgical instrument holder suspended from the cross
5 member, wherein the cross member has a curved center section which spans between the
6 supports and has opposite curved ends which are disposed in planes which are perpendicular
7 to the curved center section.

1 2. The system of claim 1, wherein the surgical instrument holder is
2 positionable along a length of the curved center section of the cross member.

1 3. The system of claim 2, wherein movement of the surgical instrument
2 holder along the length of the curved center section of the cross member results in rotation of
3 the surgical instrument holder about a point disposed on an axis passing through centers of
4 curvature of the opposite curved end portions of the cross member.

1 4. The system of claim 1, wherein the surgical instrument holder
2 positions a surgical instrument in a plane along which an axis extending through centers of
3 curvature of the opposite curved end portions of the cross member passes.

1 5. A surgical instrument positioning system, comprising:
2 at least one support;
3 a cross member having at least one curved end portion, the at least one
4 curved end portion being held by the at least one support such that the cross member is
5 rotatable about an axis extending through a center of curvature of the at least one curved end
6 portion of the cross member; and
7 at least one surgical instrument holder suspended from the cross
8 member.

1 6. The system of claim 5, wherein the surgical instrument holder is
2 positionable along a length of the cross member.

1 7. The system of claim 6, wherein the surgical instrument holder is
2 positionable along a curved section of the cross member.

18. The system of claim 12, further comprising:
a coronal marker positioned on the straight portion of the cross member.

19. The system of claim 5, further comprising:
an alignment target attached to one of the at least one curved end portions of the cross member.

20. The system of claim 19, wherein the alignment target indicates the position of the axis extending through the center of curvature of the at least one curved end portion of the cross member.

21. The system of claim 19, wherein the alignment target indicates the position of a plane along which the axis extending through the center of curvature of the at least one curved end portion of the cross member passes.

22. The system of claim 21, wherein the surgical instrument holder positions a surgical instrument in the plane passing through the axis extending through the center of curvature of the at least one curved end portion of the cross member.

23. The system of claim 5, wherein the at least one support adjustably positions the cross member in a vertical direction.

24. The system of claim 5, wherein the at least one support adjustably positions the cross member in a first horizontal direction.

25. The system of claim 5, wherein the at least one support adjustably positions the cross member in a second horizontal direction, the second horizontal direction being perpendicular to the first horizontal direction.

26. The system of claim 5, further comprising:
at least one alignment laser source attached to one of the curved end portions of the cross member.

27. The system of claim 26, wherein the at least one alignment laser source emits a laser beam in a plane passing through the center of curvature of the at least one curved end portion of the cross member.

1 38. The system of claim 5, wherein the cross member is radio-lucent.

39. A method of positioning a surgical instrument in a selected plane
passing through a patient's body, comprising:

3 positioning a patient under a cross member having a curved section
4 which spans between two supports on either side of the patient, the cross member having
5 opposite curved ends which are disposed in planes which are perpendicular to the curved
6 center section, the opposite curved ends each being supported by one of the supports;

adjusting the position of the cross member such that an axis passing through the centers of curvature of the opposite ends of the cross member also passes through a surgical target region on the selected plane;

adjusting the position of the cross member such that a plane disposed
parallel to the curved center section of the cross member is disposed in the selected plane;
and

adjusting the position of a surgical instrument holder suspended from
the cross member such that a surgical instrument suspended in the surgical instrument holder
is positioned at a preferred angle in the selected plane.

40. A method of positioning a surgical instrument in a selected plane passing through a patient's body, comprising:

positioning the patient under a cross member having a surgical instrument holder suspended therefrom, the cross member having a curved end portion which is held by a support such that the cross member is rotatable about an axis extending through the center of curvature of the curved end portion of the cross member, the surgical instrument holder being positioned to hold a surgical instrument in a plane in which the axis extending through the center of curvature of the curved end portion of the cross member is disposed;

adjusting the position of the cross member such that the axis extending through the center of curvature of the at least one curved end portion of the cross member is disposed in the selected plane; and

12 rotating the cross member about the axis extending through the center
13 of curvature of the at least one curved end portion of the cross member such that the plane in
14 which the surgical instrument is held is aligned with the selected plane.

1 41. The method of claim 40, wherein adjusting the position of the cross
2 member such that the axis extending through the center of curvature of the at least one curved
3 end portion of the cross member is disposed in the selected plane comprises:
4 adjusting the vertical height of the cross member.

1 42. The method of claim 40, wherein adjusting the position of the cross
2 member such that the axis extending through the center of curvature of the at least one curved
3 end portion of the cross member is disposed in the selected plane comprises:
4 adjusting the cephal-caudal positioning of the cross member.

1 43. The method of claim 40, wherein adjusting the position of the cross
2 member such that the axis extending through the center of curvature of the at least one curved
3 end portion of the cross member is disposed in the selected plane comprises:
4 adjusting the lateral positioning of the cross member.

1 44. The method of claim 40, wherein adjusting the position of the cross
2 member such that the axis extending through the center of curvature of the at least one curved
3 end portion of the cross member is disposed in the selected plane comprises:
4 rotating the cross member about a vertical axis.

1 45. The method of claim 40, wherein adjusting the position of the cross
2 member such that the axis extending through the center of curvature of the at least one curved
3 end portion of the cross member is disposed in the selected plane comprises:
4 rotating the cross member about a horizontal axis.

1 46. The method of claim 40, wherein adjusting the position of the cross
2 member such that the axis extending through the center of curvature of the at least one curved
3 end portion of the cross member is disposed in the selected plane comprises:
4 viewing an image of the patient with a C-arm image intensifier in a
5 direction along the selected plane; and
6 aligning the cross member to the C-arm image intensifier.

1 60 . The laser alignment system of claim 57, wherein the at lease one laser
2 source comprises:
3 four laser sources mounted to an emitter on the image intensifier, wherein a
4 first pair of the laser sources project a laser beam in a first plane and a second pair of the laser
5 sources project a laser beam in a second plane.

1 61. The laser alignment system of claim 57, further comprising:
2 an image intensifier having an emitter and a receiver, wherein the alignment
3 system is mounted to the image intensifier such that the first and second planes intersect
4 along a line which passes both through the center of the emitter and through the center of the
5 receiver.

1 62. The laser alignment system of claim 61, wherein the image intensifier
2 comprises a C-arm image intensifier, and wherein the C-arm is mounted to rotate within the
3 first plane such that the emitter and the receiver remain disposed within the first plane as the
4 C-arm is rotated.